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ABSTRACT

Second language reading research based on a psycholinguistic approach was undertaken. A model of the language user derived from the literature on first language acquisition was used. The role of conceptualization in second language reading, including the effects of interference and other factors in the first language, is discussed, and experimental evidence is presented. Educational implications are also considered. The model of the language user in man consists of six main systems: the speech or script recognizer, the sentence parser, the conceptual system, the lexicon, the sentence generator, and the articulator or handwriter. The functioning of the sentence parser and its reliance on the lexicon and the conceptual system is a central concern. First and second language contrasts and reading comprehension is discussed. A research approach of the SHADOK-project was replicated in which Dutch and French speaking adults read a French instruction for finding their way in an imaginary French town. Two sentence versions, one with a parallel structure and the other with a contrastive structure, were used. Reading in both the first and second languages was positively influenced by preliminary training with a city map. Conceptual analysis overruled syntactic analysis, and the difference between contrastive and parallel versions was minimal. A second experiment used the SHADOK apparatus instead of the city plan and translations of the text showed more difficulty for contrastive than for parallel versions. (SW)

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Conceptualisation in second language reading - experimental findings on this process in relation to reading the first language*

Reviewing some recent studies in foreign language curriculum development, especially those of the Council of Europe (van Ek & Alexander, 1975 and 1976; Coste et al., 1976; see for a survey Shaw, 1977) one welcomes the stress on communicative aspects of foreign language use as integral to the objectives and standards of these curricula. One point however is striking: there are only rare references to psycholinguistic research in first and second language acquisition, while both types of acquisition processes are concerned with describing objectives and standards. This is the more surprising since in 1966 Banathy stressed, as bases of content selection in foreign language curricula, findings from contrastive analyses and error analyses, which drew on research in psycholinguistics and considered notions such as difficulty, accuracy, automaticy, speed and response fluency. Moreover since that thesis a considerable number of publications has appeared on these topics. Language learning grammars must take some account of the processes which language users employ, when they read, speak or write a foreign language.

In this paper I would like to review our own experimental research in second language reading; the results are relevant in developing syllabuses and curricula. Essential to our psycholinguistic approach is a

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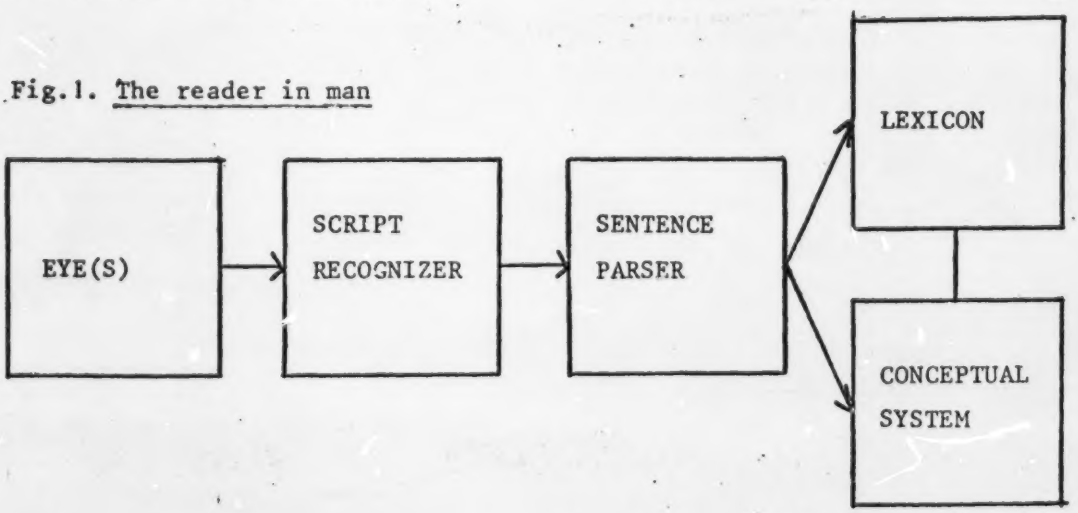
model of the language user that can be distilled from the literature on first language use (Schank, Miller & Johnson-Laird, Clark & Clark, Kempen). One point which will be dealt with in more detail later on, is the role of conceptualisation on second language reading, including the effects of interference and other factors in the first language. Experimental evidence is offered on this issue and educational implications are also considered.

A model of the language user in man

The model designated to the language user in man is more powerful than a skills model (Herriot, Levelt) as it permits an integrative view of comprehension and production processes and their semantic aspects. We can only briefly describe the model here. (For details see Kempen, 1976 and forthcoming, and the literature referred to that.) It consists of six main systems: the speech or script recognizer, the sentence parser, the conceptual system, the lexicon, the sentence generator, the articulator or handwriter. A central position in this approach is occupied by the mutually linked conceptual system and lexicon. Other systems are specific for the various skills: listening, reading, speaking and writing. We focus here on the reading process, but the facts for listening are probably quite similar.

Fig.1. The reader in man



In reading the eye perceives letters and blanks, the script recognizer next tries to identify the script (asking e.g. whether the graphemic conventions are familiar, what language the text is written in), and to discover in it phonological units such as phonemes and syllables. Even in this preliminary process it may be helpful to use the other elements of the human reader, such as the sentence parser, the lexicon and the conceptual system. Here, however, we are chiefly concerned with the next stage in the reading process: the functioning of the sentence parser and its reliance on the lexicon and the conceptual system.

Reading comprehension

The task of the sentence parser in second language reading is to detect the structure of concepts that represents the meaning of each input sentence, that is the 'conceptualisation' underlying each sentence in the text. It starts out from the results obtained by the script recognizer, uses its own syntactic knowledge and has access to the conceptual system and lexicon for conceptual and lexical information. The parser can operate in one of two ways, either with syntactically guided analysis or with conceptually guided analysis (cf. the syntactic and semantic approach to the comprehension process as described by Clark & Clark, 1977). The results of an experiment in oral reading reflect the importance of both semantic and syntactic constraints as factors in controlling segmentation (Vázquez, Gluckberg & Danks, 1977). Ulijn & Kempen (1976) argue on the basis of Schank's interpretation system (1975) that conceptually guided reading is much more efficient. Here the parser applies a superficial and incomplete syntactic analysis to the input in that only the surface subject noun and the main verb of the sentence are located. Then the lexicon is consulted in order to make available the conceptual information listed in the entries for main verb and subject noun.

On the basis of this conceptual information, the parser generates expectations about the identity of further possible constituents of the input sentence. It might even be possible to locate content words in the text, to link them to concepts by means of the lexicon and conceptual system and to guess a posteriori the syntactic structure of the sentence if this is still necessary for efficient comprehension. In the case of syntactic guidance a preliminary *thorough* syntactic analysis would be performed anyway, but this would still have to be complemented by a conceptual analysis. We deliberately leave out here another important aspect of conceptual information in reading, that is inference, because it is not very relevant to our conceptual/syntactic discussion. (see Schank & Abelson, 1975 and Noordman, 1977, however).

Primacy of conceptual analysis in second language reading implies that it will be more important to know all kinds of conceptual content words – rather than syntactic function words – and that ambiguous words will be more difficult for conceptual analysis than unambiguous ones. The SHADOK-project (Ulijn, 1977a, 1978 and forthcoming) gave the indication that a (Dutch) reader of a foreign (French) scientific and technical text is more hampered by the various kinds of content words, such as technical terms and nominalisations, required for conceptual analysis. Function words are only essential in the case of a thorough syntactic analysis (χ^2 = 14.09, highly significant at $p < 0.001$). In the same study ambiguous words appeared to be more difficult than unambiguous ones (χ^2 = 4.03, significant at $p < 0.05$).

L_1-L_2 contrasts and reading comprehension

Primacy of conceptual analysis has consequences for the role of L_1-L_2 contrasts in L_2 reading. Until recently, the contrastive analysis hypothesis, whether in its strong or weak version, has rarely been related to L_2 comprehension. Even studies of interlanguage have tended to over-

look this issue, for most of these studies are concerned with production. However, Cowan (1976) does connect L_1-L_2 contrasts with reading and concludes, on the basis of English read by Japanese and Persians and Hindi read by English speaking subjects, that comprehension errors result from syntactic misinterpretation because of L_1-L_2 contrasts. Unfortunately, his description of the reading process is very superficial and his error analysis rather unsystematic. Hence one cannot conclude that these data support the predictive value of CA; further research is required.

A second problem in the CA or interlanguage literature is a lack of a clear and sound definition of contrasts. Ulijn & Kempen (1976) and Uijn (1978) have suggested an approach which takes into account the range of formal contrasts - as opposed to conceptual ones - and which distinguishes between lexicon and syntax.

If the sentence parser is concept-oriented, all kinds of lexical contrasts which are potential carriers of conceptual confusion give rise to greater problems in comprehension than conceptually parallel lexical items do. Once the conceptual difficulties are surmounted, the reader will be indifferent to syntactic contrasts or parallels in the text. Syntactic contrasts often will remain unnoticed.

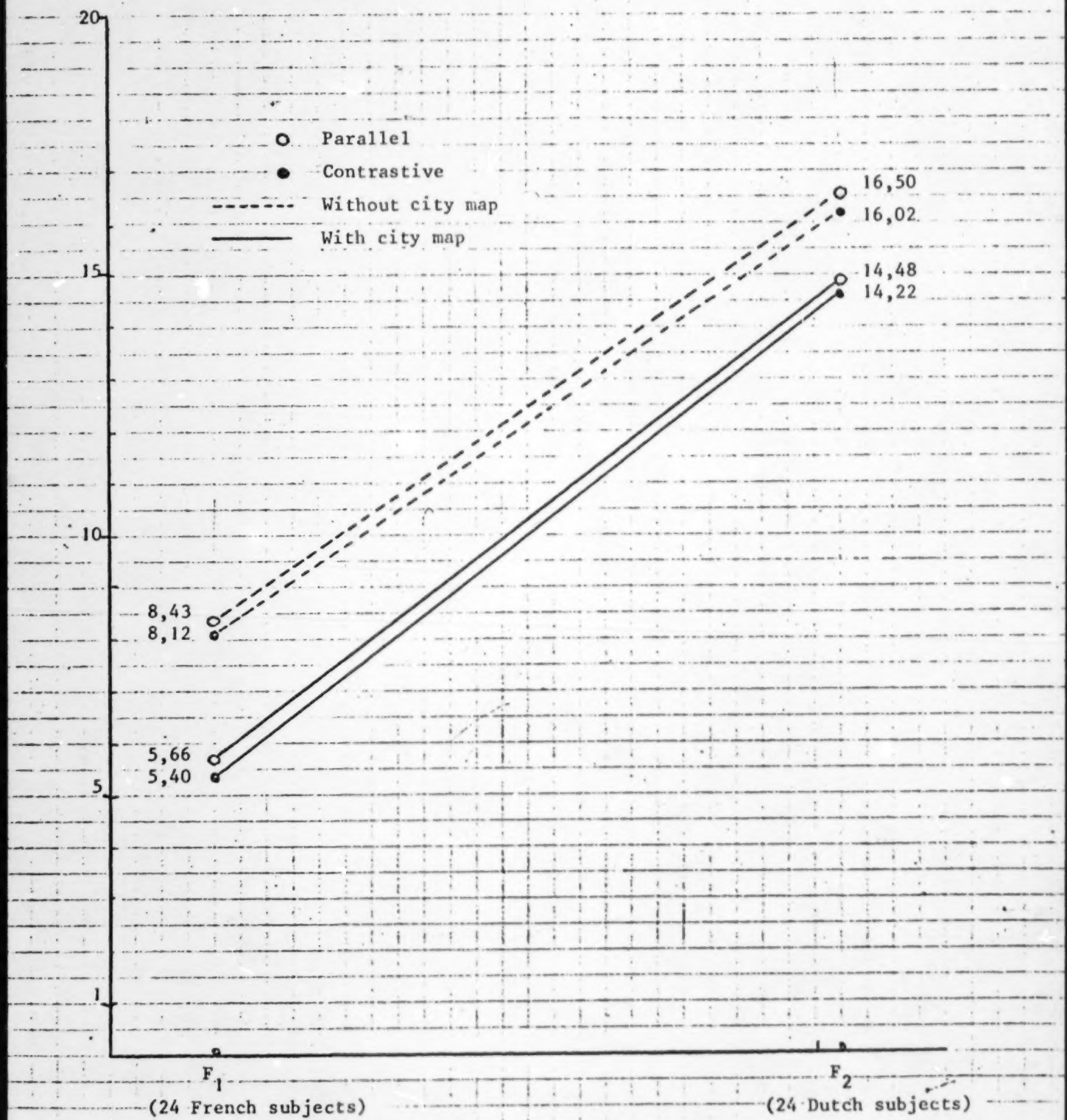
The SHADOK-project also gave evidence on these two points. 'Faux amis' as *interrupteur*(= English *switch*/Dutch *schakelaar* and not English *interruptor*), *voyant* (= English *light*/Dutch *lampje* and not Dutch *voyeur*), *afficher* and *basculer* (no clear semantic relations with Dutch *affiche* or *bascule*), caused more comprehension problems than words with an international appearance, like *code, conversion digitale analogique, potentiomètre, voltmètre,* etc. (Fisher's exact probability-test, significant at $p = 0.03$).

A further experiment dealt with syntactic contrasts and parallels (infinitive and participle constructions as opposed to subordinate clauses, which hardly occur in Dutch as an alternative structure). This study showed the same pattern of difficulties for L_1 and L_2 readers (5 French and 43 Dutch engineering students reading French), even though the Dutch students processed the sentences containing the above mentioned syntactic variant mentioned three times more quickly (see for a complete description of this experiment Ulijn, 1977b and Ulijn, 1978). On the basis of this it is hard to speak about an L_1-L_2 interlingual effect, when the same interlingual effect is observed within L_1 and with an identical pattern. Obviously it is a question of the intrinsic difficulty of the French language.

One very recent experiment enabled us to replicate the somewhat exploratory approach of the SHADOK-project (Ulijn, forthcoming). 24 Dutch and 24 French speaking adults (mainly university students) read a French instruction for finding their way in an imaginary French town (see Appendix 1). The complete text consisted of 34 steps, each step was expressed in one sentence (see Appendix 2). For 18 of the steps we formulated two sentenc versions. One version contained a parallel structure, the other one a contrastive structure. In total there were structures for 12 notions: nécessité (*il vous fait/vous devez*, 2 pairs), agent secondaire (*se*-construction/*être*-construction), word order (2 pairs), mise en relief (*c'est ... que*), subjonctif, *ne*-explétif, relative, temporelle (3 pairs), causale (2 pairs), condition (2 pairs), opposition and consécutive. The last 6 notions contained a subordinate clause as a syntactic parallel between French and Dutch, and a participle or infinitive construction as a syntactic contrast. From the 18 pairs and the remaining 16 sentences we prepared two texts. Each text contained the 16 sentences and one member of every pair of semantically similar sentences. Thus one text contained 9 parallel and

9 contrastive sentences. The remaining sentences in the pairs went into the other text. Both the Dutch and the French subjects were randomly divided into two groups, one group for each text. We suspected that the text with less conceptual information would force the reader to use more syntactic analysis and that in this case syntactic contrasts would cause more difficulties than syntactic parallels. Thus each group was randomly divided into two conditions: one with and one without preliminary training in memorizing the map of the above mentioned town. In the first highly contextualised condition, it should not make any difference whether the reader meets a contrastive or a parallel construction. The mean reading times over all 18 sentences are represented in fig.2.

Figure 2. Mean reading times in seconds for French as a first and a second language distributed over the conditions with/without map and parallel/contrastive sentence



The results of the first (SHADOK) experiment on syntactic contrasts were confirmed. The difference between contrastive and parallel versions is minimal and the pattern of L_1 and L_2 reading is the same, but L_1 reading is 2 to 3 times quicker. Both L_1 and L_2 reading are positively influenced by preliminary training with the city map. Even the conceptually more handicapped L_2 readers (without city maps) are not obstructed by syntactic contrasts with their L_1. Conceptual analysis overrules syntactic analysis. The range of conceptual information employed however was limited. This seems to have prevented the text from being sensitive enough to detect any syntactic primacy in reading.

Does the primacy of conceptual analysis occur in all kinds of reading? What happens, for instance, if the reader lacks indispensable conceptual or other information and cannot infer it? Bransford & Johnson (1973) reported several studies showing that one may not be able to process linguistic input effectively without acces to a substratum of additional information, such as visual information.

An L_2 reader who lacks essential conceptual information will be forced to read through word by word and to capitalize on his syntactic knowledge in order to detect the hidden conceptualisations. In such a situation it can be predicted that linguistic contrasts will hamper comprehension of the text. Another experiment (Ulijn & Kempen, 1976) gave evidence on this point. We used the same type of text, as regards linguistic structure as above, but instead of a city plan we gave instructions for the use of an apparatus (SHADOK). The subjects here were 43 psychology students without any technical knowledge and without access to the apparatus itself. Their translations of the text showed more difficulties for contrastive than for parallel versions (sign test, highly significant at $p < 0.001$).

One subsidiary result is worth noticing. For most of the sentence pairs a majority of the subjects managed to produce correct translations. There is one striking exception: *à moins que* (parallel) and *à moins de* (contrastive) hardly received any correct interpretation (15 and 0 percent). Here the reader has to overcome confusions between conceptual patterns. *À moins que* and *à moins de* mislead, because *moins* (= *less*) is associated with the concept of quantity instead of condition. Also, the Dutch equivalent of *à moins que* (= *tenzij*) has no connections with the Dutch equivalent of *moins* (= *minder*), unlike the English *unless*. In addition, it seems that *unless* has instrinsic difficulty of L_1. Noordman (1977) found in an L_1 comprehension experiment that *unless* is more difficult to handle than *if ... then*.

Educational implications

If we come back to our earlier statement about functioning of the sentence parser in L_2 reading, we must conclude that a reader prefers conceptual analysis. This process is hampered more by content words than by function words and more by ambiguous words than by unambiguous ones. Only contrasts which lead along the wrong conceptual track are harmful to reading comprehension, especially at the lexical and syntactic ones play only a minor role. These results suggest that foreign language instruction aiming at promoting reading skills in students should concentrate on vocabulary (content words are the salient carriers of the conceptual information in the text) and on those syntactic structures which are likely to lead to conceptual confusion. Not all syntactic and lexical details have to be overcome in order to perform a succesful conceptual analysis. Systematic training in word deviation procedures and in composing word families for easy recognition of unknown content words will be more useful than teaching all kinds of parallel or contrastive syntactic structures. The last experiment mentioned shows once more that translation is a bad form of reading

training. It implies a syntactically guided reading process, but this poses all sorts of syntactic difficulties and reduces reading speed, which is another important element of efficient reading.

Thus we conclude that a reading grammar can be more limited than a speaking or writing grammar and that it should be coupled with an extensive word acquisition program. The kind of psycholinguistic research presented here seems to have important bearings on the description of objectives in FL curricula and syllabuses, in that it may be possible to determine by skill and level the relative place of lexicon and grammar. Such questions as speed and automatising certain skills can also be taken into account, as can the role of the first language in reading a second language.

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August 14.1978/MB

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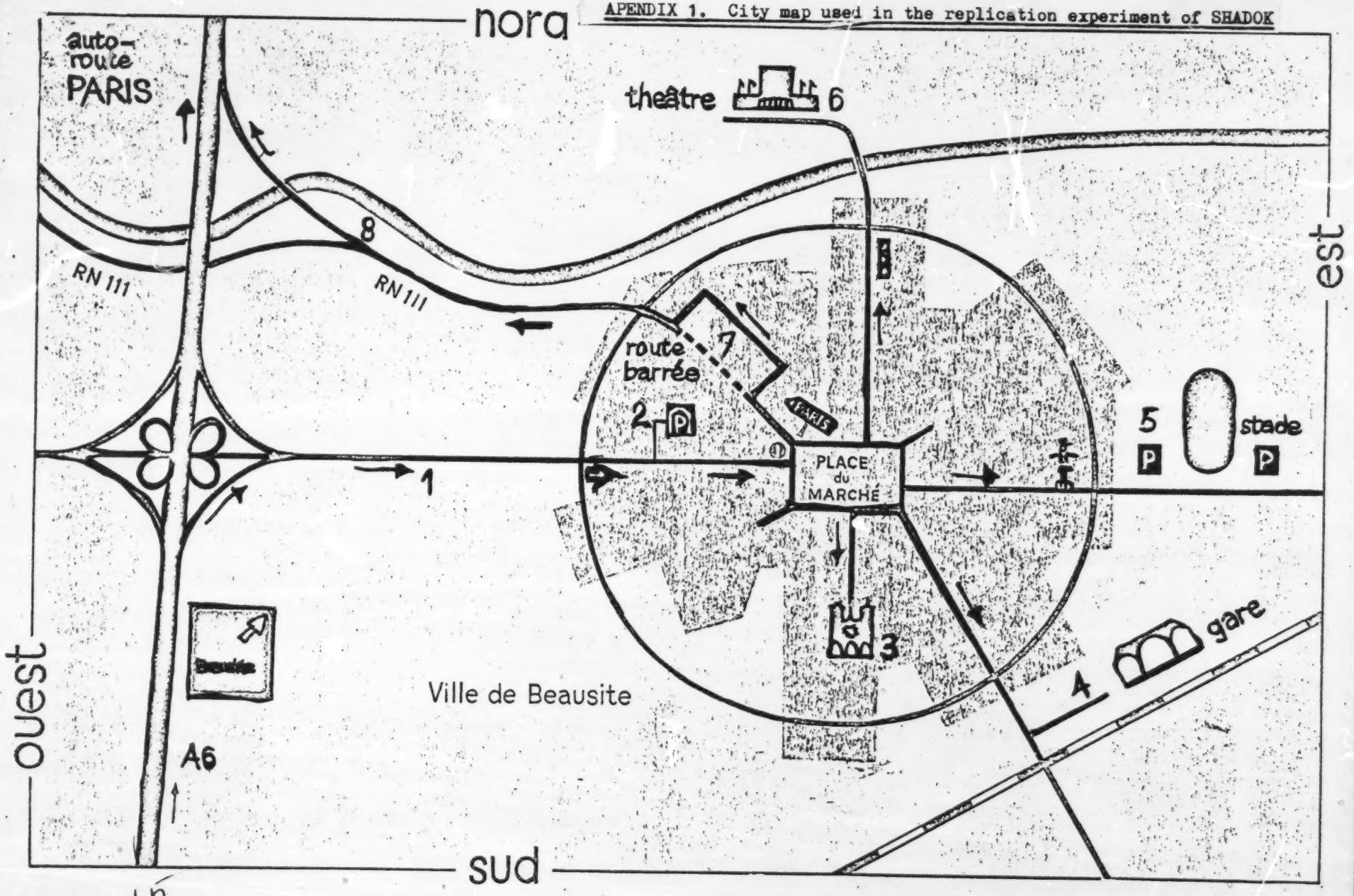
APENDIX 1. City map used in the replication experiment of SHADOK



Appendix 2.

The sentences used in the replication experiment of SHADOK

TROUVER LE BON CHEMIN

1. Pour le centre de la ville de Beausite

1.1. *Vous quitterez* / *Quittez* l'autoroute à la sortie de "Beausite".

1.2. *Une fois arrivé* / *Une fois que vous serez arrivé* au panneau "sens unique", vous continuez tout droit.

1.3. *Vous suivrez* / *Suivez* en fait la flèche "centre-ville", pour atteindre la place du marché.

1.4. *En reprenant l'autoroute A6* / *Si vous vouliez reprendre l'autoroute A6!* vous pourriez suivre le même itinéraire.

Question: Avez-vous le droit de suivre le même trajet, en revenant ou non?

2. Pour le parking souterrain

2.1. *Il vous faut* / *Vous devez* garer votre voiture pour la durée de votre visite à Beausite.

2.2. Vous allez le faire *avant de ganger* / *avant que vous gagniez* la place du marché.

2.3. Il y an u parking soutterain à l'entrée de la ville.

2.4. Pour y arriver *il vous faut* / *vous devez* prendre la première rue à gauche.

Question: Où trouvez-vous le parking soutterain, à gauche ou à droite?

3. Pour la cathédrale

3.1. Le même trajet *s'effectue* / *est effectué* jusqu'à la place du marché.

3.2. Là vous verrez la tour de la cathédrale à votre droite.

3.3. Serrez de ce côté *de façon à pouvoir emprunter* / *de façon que vous puissiez emprunter* la rue qui y mène directement.

Question: Faut-il passer par la place du marché, ou non?

4. Pour la gare

4.1. A partir de la place du marché vous suivez *une avenue très longue* / *une très longue avenue* au bout de laquelle vous voyez un passage à niveau.

4.2. *En arrivant* / *Quand vous arrivez* devant la foie ferrée, vous tournez à gauche.

4.3. Adressez-vous au bureau de renseignements de la gare et dites-leur *qu'on vous remette* / *de vous remettre* un ticket de stationnement.

Question: Faut-il tourner à gauche avant ou après la voie ferrée?

5. Pour le stade

5.1. Vous êtez à la place du marché.

5.2. Prenez l'avenue *partant* / *qui part* dans la direction EST et vous tombez sur un agent de police.

5.3. *C'est à cet endroit que* / *A cet endroit* vous devez aller tout droit.

5.4. Vous arrivez dans un quartier à l'exterieur du boulevard periphérique.

5.5. A un moment donné vous voyez le stade sur votre gauche.

5.6. Je crains que le parking avant le stade *ne soit* / *soit* complet.

5.7. *Ce lieu de stationnement étant impossible* / *Si ce lieu de stationnement est possible*, il vous serait conseillé de prendre celui qui le suit du même côté de l'avenue.

5.8. Question: Le stade se situe-t-il avant ou après l'agent de police?

6. Pour le théâtre

6.1. Partez dans la direction NORD:

6.2. Vous passez par des feux où *circulent beaucoup de poids lourds* / *beaucoup de poids lourds circulent*.

6.3. *Ce carrefour étant traversé,* / *Lorsque ce carrefour sera traversé*, vous poursuivez votre chemin.

6.4. *A condition d'avoir le pont ouvert* / *A condition que le pont soit ouvert*, vous allez vous retrouver automatiquement en face du théâtre.

Question: Le théâtre se situe-t-il avant où après les feux?

7. Paris par l'autoroute A6 (I)

7.1. La place du marché est toujours votre point de départ pour prendre la direction Paris.

7.2. *La route étant barrée* / *Comme la route est barrée*, vous allez suivre l'itinéraire fléché "déviation".

7.3. A un moment donné, après les travaux, vous finissez par tourner à droite, en rejoignant ainsi le chemin qui conduit à l'autoroute direction Paris.

Question: Y a-t-il une route barrée ou non?

8. Pour Paris par l'Autoroute A6 (II)

8.1. Vous continuez dans la direction Paris-Autoroute.

8.2. Le boulevard périphérique coupe votre chemin qui s'appelle désormais RN 111, et qui va longer une rivière à la sortie de la ville.

8.3. Cette rivière sera à votre droite, *à moins d'avoir* / *à moins qu'elle ait* envahi les quais.

8.4. Dans ce cas une déviation sera mise en place.

8.5. Vous quittez la RN 111 et passez tout droit par le pont, *la bretelle d'accès étant située de l'autre côté de la rivière* / *parce que la bretelle d'accès est située de l'autre côté de la rivière*.

8.6. De cette façon vous pouvez vous engager sur l'autoroute direction Paris.

Question: Où se trouve la rivière maintenant?

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